

PENDING CLAIMS

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1. (Currently Amended) A method for downloading code to a resource constrained computer, the code being separable into at least one package having at least one referenceable item, comprising:
forming the package;
forming a mapping of the referenceable item to a corresponding token having a token type,
tokens belonging to the same token type representing the same kind of referenceable
item, each kind of referenceable item in said package having its own independent scope
for tokens of the corresponding token type; and
providing the package and the mapping.
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 2. (Currently Amended) A method for linking code downloaded to a resource constrained computer, the code being separable into at least one package having at least one referenceable item, comprising:
receiving the package;
receiving a mapping of the referenceable item to a corresponding token having a token type,
tokens belonging to the same token type representing the same kind of referenceable
item, each kind of referenceable item in said package having its own independent scope
for tokens of the corresponding token type; and
linking the package using the mapping.

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3. (Currently Amended) A method for linking code downloaded to a computer, the computer comprising a first package that includes a mapping of tokens to externally referenceable items, the method comprising:

receiving a second package comprising at least one reference to an item in said first package, wherein said reference is represented by one or more tokens having a token type, tokens belonging to the same token type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for tokens of the corresponding token type; and linking said second package to said first package by resolving said one or more tokens.

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4. (Currently Amended) A method for constructing an image of a first package of code on a computer, the code being separable into at least one package having at least one reference to an item in a second package of code, the method comprising:

receiving a mapping of said item to at least one corresponding token having a token type, tokens belonging to the same token type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for tokens of the corresponding token type;

replacing said at least one reference with said at least one corresponding token; and forming said package.

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5. (Currently Amended) A method for constructing an image of a first package of code comprising at least one internally referenceable item, the method comprising:
forming a mapping of said at least one internally referenceable item to an optimized numeric value having a type, optimized numeric values belonging to the same type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for optimized numeric values of the corresponding type;
replacing references to said at least one internally referenceable item with the corresponding numeric value; and
forming the package.
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6. (Cancelled)
7. (Previously Added) The method of claim 1, further comprising recording in an image of said package a mapping between said token and said referenceable item.
8. (Previously Added) The method of claim 1 wherein said referenceable item comprises a class and said reference comprises a package and a class token.
9. (Previously Added) The method of claim 1 wherein said referenceable item comprises a field and said reference comprises a package, a class and a field token.

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10. (Previously Added) The method of claim 1 wherein said referenceable item comprises a method and said reference comprises a package, a class and a method token.

11. (Cancelled)

12. (Previously Added) The method of claim 3, further comprising recording in an image of said package a mapping between said token and said referenceable item.

13. (Previously Added) The method of claim 3 wherein said referenceable item comprises a class and said reference comprises a package and a class token.

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14. (Previously Added) The method of claim 3 wherein said referenceable item comprises a field and said reference comprises a package, a class and a field token.

15. (Previously Added) The method of claim 3 wherein said referenceable item comprises a method and said reference comprises a package, a class and a method token.

16. (Previously Added) The method of claim 1 wherein
said package further comprises interfaces and interface method definitions; and
said method further comprises constructing at least one interface method table for a class.

17. (Previously Added) The method of claim 16 wherein said constructing comprises:
obtaining said interfaces;

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constructing an ordered table of methods for each interface; and
recording an indication of the implementation of the interface method for each table entry.

18. (Previously Added) The method of claim 17 wherein said ordered interface method table entries correspond to token values assigned to interface methods within the scope of said class.

19. (Previously Added) The method of claim 18 wherein said indication of said implementation of said interface method comprises an index into a virtual method table.

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20. (Previously Added) The method of claim 3, further comprising resolving interface method references during execution using interface method tables, said resolving comprising:
obtaining an associated instance;
obtaining a class description of said instance;
locating an interface table of said interface method in said class description;
locating an interface method entry within an interface table of a referenced method; and
locating the implementation of said interface method based on the table entry content.

21. (Previously Added) The method of claim 20 wherein an indication of said implementation of said interface method comprises an index into a virtual method table.

PC 22. (Previously Added) The method of claim 5 wherein said package further comprises at least one reference to an internal item.

23. (Previously Added) The method of claim 22 wherein said internal item comprises a class and said reference comprises an offset within said package to a class record associated with said class.

24. (Previously Added) The method of claim 22 wherein said internal item comprises a static field and said reference comprises an offset within said package to a value for said static field.

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26. (Previously Added) The method of claim 22 wherein said internal item comprises an instance field and said reference comprises an offset within said package to a class record of said instance field and a field token.

27. (Previously Added) The method of claim 22 wherein said internal item comprises a virtual method and said reference comprises an offset within said package to a class record of said virtual method and a method token.

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28. (Currently Amended) A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for downloading code to a resource-constrained computer, the code being separable into at least one package having at least one referenceable item, the method comprising:

forming the package;

forming a mapping of the referenceable item to a corresponding token having a token type, tokens belonging to the same token type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for tokens of the corresponding token type; and

providing the package and the mapping.

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29. (Currently Amended) A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for linking code downloaded to a resource-constrained computer, the code being separable into at least one package having at least one referenceable item, the method comprising:

receiving the package;

receiving a mapping of the referenceable item to a corresponding token having a token type, tokens belonging to the same token type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for tokens of the corresponding token type; and

linking the package using the mapping.

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30. (Currently Amended) A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for linking code downloaded to a computer, the computer comprising a first package that includes a mapping of tokens to externally referenceable items, the method comprising:

receiving a second package comprising at least one reference to an item in said first package, wherein said reference is represented by one or more tokens having a token type, tokens belonging to the same token type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for tokens of the corresponding token type; and

linking said second package to said first package by resolving said one or more tokens.

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31. (Currently Amended) A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for constructing an image of a first package of code on a computer, the code being separable into at least one package having at least one reference to an item in a second package of code, the method comprising:

receiving a mapping of said item to at least one corresponding token having a token type, tokens belonging to the same token type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for tokens of the corresponding token type;

replacing said at least one reference with said at least one corresponding token; and


forming said package.

32. (Currently Amended) A program storage device for constructing an image of a first package of code comprising at least one internally referenceable item, the method comprising:
forming a mapping of said at least one internally referenceable item to an optimized numeric value having a type, optimized numeric values belonging to the same type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for optimized numeric values of the corresponding type;
replacing references to said at least one internally referenceable item with the corresponding numeric value; and
forming the package.
33. (Cancelled)
34. (Previously Added) The program storage device of claim 28 wherein said method further comprises recording in an image of said package a mapping between said token and said referenceable item.
35. (Previously Added) The program storage device of claim 28 wherein said referenceable item comprises a class and said reference comprises a package and a class token.
36. (Previously Added) The program storage device of claim 28 wherein said referenceable item comprises a field and said reference comprises a package, a class and a field token.

 37. (Previously Added) The program storage device of claim 28 wherein said referenceable item comprises a method and said reference comprises a package, a class and a method token.

38. (Cancelled)

39. (Previously Added) The program storage device of claim 30 wherein said method further comprises recording in an image of said package a mapping between said token and said referenceable item.



 40. (Previously Added) The program storage device of claim 30 wherein said referenceable item comprises a class and said reference comprises a package and a class token.

41. (Previously Added) The program storage device of claim 30 wherein said referenceable item comprises a field and said reference comprises a package, a class and a field token.

42. (Previously Added) The program storage device of claim 30 wherein said referenceable item comprises a method and said reference comprises a package, a class and a method token.

43. (Previously Added) The program storage device of claim 28 wherein said package further comprises interfaces and interface method definitions; and said method further comprises constructing at least one interface method table for a class.

44. (Previously Added) The program storage device of claim 43 wherein said constructing comprises:
obtaining said interfaces;
constructing an ordered table of methods for each interface; and
recording an indication of the implementation of the interface method for each table entry.
45. (Previously Added) The program storage device of claim 44 wherein said ordered interface method table entries correspond to token values assigned to interface methods within the scope of said class.
46. (Previously Added) The program storage device of claim 45 wherein said indication of said implementation of said interface method comprises an index into a virtual method table.
47. (Previously Added) The program storage device of claim 30 wherein said method further comprises resolving interface method references during execution using interface method tables, said resolving comprising:
obtaining an associated instance;
obtaining a class description of said instance;
locating an interface table of said interface method in said class description;
locating an interface method entry within an interface table of a referenced method; and
locating the implementation of said interface method based on the table entry content.

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48. (Previously Added) The program storage device of claim 47 wherein an indication of said implementation of said interface method comprises an index into a virtual method table.
49. (Previously Added) The program storage device of claim 32 wherein said package further comprises at least one reference to an internal item.
50. (Previously Added) The program storage device of claim 49 wherein said internal item comprises a class and said reference comprises an offset within said package to a class record associated with said class.
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51. (Previously Added) The program storage device of claim 49 wherein said internal item comprises a static field and said reference comprises an offset within said package to a value for said static field.
52. (Previously Added) The program storage device of claim 49 wherein said internal item comprises a static method and said reference comprises an offset within said package to code associated with said static method.
53. (Previously Added) The program storage device of claim 49 wherein said internal item comprises an instance field and said reference comprises an offset within said package to a class record of said instance field and a field token.

54. (Previously Added) The program storage device of claim 49 wherein said internal item comprises a virtual method and said reference comprises an offset within said package to a class record of said virtual method and a method token.
55. (Currently Amended) An apparatus for downloading code to a resource-constrained computer, the code being separable into at least one package having at least one referenceable item, the apparatus comprising:
- means for forming the package;
 - means for forming a mapping of the referenceable item to a corresponding token having a token type, tokens belonging to the same token type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for tokens of the corresponding token type; and
 - means for providing the package and the mapping.
56. (Currently Amended) An apparatus for linking code downloaded to a resource-constrained computer, the code being separable into at least one package having at least one referenceable item, the apparatus comprising:
- means for receiving the package;
 - means for receiving a mapping of the referenceable item to a corresponding token having a token type, tokens belonging to the same token type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for tokens of the corresponding token type; and
 - means for linking the package using the mapping.

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57. (Currently Amended) An apparatus for linking code downloaded to a computer, the computer comprising a first package that includes a mapping of tokens to externally referenceable items, the apparatus comprising:

means for receiving a second package comprising at least one reference to an item in said first package, wherein said reference is represented by one or more tokens having a token type, tokens belonging to the same token type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for tokens of the corresponding token type; and

means for linking said second package to said first package by resolving said one or more tokens.

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58. (Currently Amended) An apparatus for constructing an image of a first package of code on a computer, the code being separable into at least one package having at least one reference to an item in a second package of code, the apparatus comprising:

means for receiving a mapping of said item to at least one corresponding token having a token type, tokens belonging to the same token type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for tokens of the corresponding token type;

means for replacing said at least one reference with said at least one corresponding token;

and

means for forming said package.

59. (Currently Amended) An apparatus for constructing an image of a first package of code comprising at least one internally referenceable item, the apparatus comprising:
- means for forming a mapping of said at least one internally referenceable item to an optimized numeric value having a type, optimized numeric values belonging to the same type representing the same kind of referenceable item, each kind of referenceable item in said package having its own independent scope for optimized numeric values of the corresponding type;
- means for replacing references to said at least one internally referenceable item with the corresponding numeric value; and
- means for forming the package.
60. (Cancelled)
61. (Previously Added) The apparatus of claim 55, further means for comprising recording in an image of said package a mapping between said token and said referenceable item.
62. (Previously Added) The apparatus of claim 55 wherein said referenceable item comprises a class and said reference comprises a package and a class token.
63. (Previously Added) The apparatus of claim 55 wherein said referenceable item comprises a field and said reference comprises a package, a class and a field token.

64. (Previously Added) The apparatus of claim 55 wherein said referenceable item comprises a method and said reference comprises a package, a class and a method token.
65. (Cancelled)
66. (Previously Added) The apparatus of claim 57, further comprising means for recording in an image of said package a mapping between said token and said referenceable item.
67. (Previously Added) The apparatus of claim 57 wherein said referenceable item comprises a class and said reference comprises a package and a class token.
68. (Previously Added) The apparatus of claim 57 wherein said referenceable item comprises a field and said reference comprises a package, a class and a field token.
69. (Previously Added) The apparatus of claim 57 wherein said referenceable item comprises a method and said reference comprises a package, a class and a method token.
70. (Previously Added) The apparatus of claim 55 wherein
said package further comprises interfaces and interface method definitions; and
said apparatus further comprises means for constructing at least one interface method table
for a class.

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71. (Previously Added) The apparatus of claim 70 wherein said constructing comprises:
- means for obtaining said interfaces;
 - means for constructing an ordered table of methods for each interface; and
 - means for recording an indication of the implementation of the interface method for each table entry.
72. (Previously Added) The apparatus of claim 71 wherein said ordered interface method table entries correspond to token values assigned to interface methods within the scope of said class.
73. (Previously Added) The apparatus of claim 72 wherein said indication of said implementation of said interface method comprises an index into a virtual method table.
74. (Previously Added) The apparatus of claim 57, further comprises means for resolving interface method references during execution using interface method tables, said means for resolving comprising:
- means for obtaining an associated instance;
 - means for obtaining a class description of said instance;
 - means for locating an interface table of said interface method in said class description;
 - means for locating an interface method entry within an interface table of a referenced method; and
 - means for locating the implementation of said interface method based on the table entry content.
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75. (Previously Added) The apparatus of claim 74 wherein an indication of said implementation of said interface method comprises an index into a virtual method table.
76. (Previously Added) The apparatus of claim 59 wherein said package further comprises at least one reference to an internal item.
77. (Previously Added) The apparatus of claim 76 wherein said internal item comprises a class and said reference comprises an offset within said package to a class record associated with said class.
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78. (Previously Added) The apparatus of claim 76 wherein said internal item comprises a static field and said reference comprises an offset within said package to a value for said static field.
79. (Previously Added) The apparatus of claim 76 wherein said internal item comprises a static method and said reference comprises an offset within said package to code associated with said static method.
80. (Previously Added) The apparatus of claim 76 wherein said internal item comprises an instance field and said reference comprises an offset within said package to a class record of said instance field and a field token.

81. (Previously Added) The apparatus of claim 76 wherein said internal item comprises a virtual method and said reference comprises an offset within said package to a class record of said virtual method and a method token.
